EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-06

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	Adaptation Planning for Coral

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2e, 2g, 2h, 2i 2j, 2L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: Adaptation Planning for Coral Reefs

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 09/30/2012 To 09/29/2016 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee: — LOE:

Cumulative Approved: — Cost/Fee: — LOE:

Work Assignment Manager Name: Jordan West (Signature) (Date)	Branch/Mail Code: Phone Number: 703-347-8584 FAX Number:
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Cranley (Signature) 09/25/15 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

PERFORMANCE WORK STATEMENT

Tetra Tech, Inc.
Contract EP-C-12-060
Work Assignment No. 3-06

TITLE: Adaptation Planning for Coral Reefs in a Changing Climate
EAS Short Title: Adaptation Planning for Coral Reefs

PERIOD OF PERFORMANCE: Award date through September 29, 2016

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Work Assignment 2-06 was a crossover work assignment. Tasks 9b thru 12 have been completed during Option Period 2. Tasks 13 thru 16 will be completed under Option Period 3 and have been renumbered as Tasks 2 through 5.

INTRODUCTION

Work in EPA's Global Change Impacts and Adaptation (GCIA) Program involves assessments of the potential vulnerability to climate change (and other global change stressors such as land-use change) of ecosystem health, water quality, human health and air quality with a focus on developing adaptation options to build resilience in the face of these vulnerabilities. Vulnerability and adaptation assessment activities in the GCIA aquatic ecosystems focus area support EPA's mission and responsibilities as defined by the Clean Water Act (CWA) and are designed to build the capacity of EPA programs, regional offices, aquatic ecosystem managers (including coral reef managers), and other decision-makers to assess and respond to global change impacts on ecosystem processes and services. The purpose of this work assignment is to provide technical support to the GCIA Program and partners to advance frameworks and methods for adaptation planning for coral reef ecosystems.

Multiple recent efforts across government, non-governmental organizations, and academia have advanced the dialogue on general principles for adaptation to climate change at the national scale (e.g.,

National Ocean Policy Strategic Action Plan, National Wildlife, Fish & Plants Climate Adaptation Strategy); for particular management systems (e.g., NOAA Climate Smart Sanctuaries framework); and from an ecosystem/conservation perspective (e.g., EcoAdapt's Climate Savvy guide). While these efforts provide critical, general theoretical underpinnings for adaptation planning, there is a need to marry these top-down principles with emerging work on bottom-up adaptation planning by actual practitioners, in order to connect the theoretical to the practical.

EPA participated in a Climate Smart Work Group convened by the National Wildlife Federation to develop a unified adaptation framework designed to be tractable and accessible for use by ecosystem managers. Case study applications of this type of framework, in combination with other approaches being experimented with on the ground, are needed in order to demonstrate utility for specific vulnerable ecosystems such as coral reefs. Thus the EPA GCIA Program -- in collaboration with EPA Regions 9 & 2 and interagency members of the Climate Change Working Group of the U.S. Coral Reef Task Force -- is developing a framework and methodology for adaptation planning, informed by feedback gained from a stakeholder workshop that occurred in Honolulu in July 2014. At the 2.5 day workshop, expert managers and scientists from Federal agencies, states, territories, academia and non-governmental organizations provided feedback on a draft framework and methodology for identifying adaptation options as part of management planning, and called for greater development of evaluation methods and tools explored at the workshop. As a result, a draft "Adaptation Design Tool" has been developed.

OBJECTIVES

Under this work assignment, the Contractor shall provide technical support for: literature/case study reviews in support of further development of the Design Tool; expert consultations with practitioners in the Pacific and Caribbean regions to "test" and provide feedback on the Design Tool; revision and submission of the case study write up for publication in a peer reviewed journal; and production of a Revised Tool with guidance for users, along with an accompanying draft journal article. The objectives of the full project are to: (1) carry out reviews and syntheses of frameworks and case studies in order to tailor existing frameworks for use in coral reef adaptation planning; (2) present a draft framework and methods to coral reef stakeholders for "testing" and critique through multiple expert elicitation exercises; (3) use stakeholder feedback along with additional literature/case study review as needed to revise the draft framework and develop methods for adaptation design and systematic evaluation of options; and (4) produce write-ups (in the form of a journal articles, book chapters, or online guidance documents) on the framework, methods, tools and lessons learned.

REQUIRED CONTRACTOR QUALIFICATIONS

1) Multidisciplinary professional expertise in assessing the impacts of climate change and other interacting stressors (such as land use change) on climate-sensitive ecosystems, including expertise in resilience and threshold theory and management adaptation.

2) Thorough knowledge of conceptual approaches, methods, trainings and on-the-ground work on climate change vulnerability assessment and adaptation planning applications for coral reef conservation and management, especially in the Pacific region and including knowledge of leading work on resilience and adaptation management focused on the Great Barrier Reef.

3) Experience developing and evaluating practical frameworks and trainings for integrating climate change considerations into management planning and building resilience into conservation.

4) Expertise in directed literature searches and synthetic analyses of available literature (including grey literature).

5) Experience designing and facilitating expert scientific workshops.

6) Experience preparing technical reports and papers written in clear, concise prose consistent with the standards of peer reviewed scientific literature.

SPECIFIC TASKS:

TASK 1 Prepare Work Plan, Cost Estimate and Develop Quality Assurance Project Plan

Task 1a: Prepare Work Plan and Cost Estimate

The Contractor shall prepare a work plan in response to this work assignment, outlining the proposed approach, expertise and staffing, and resources needed, and a schedule to complete each task. The work plan should identify potential data and tools needed and any potential problems that might be encountered during the execution of the work assignment.

Task 1b: Develop a Quality Assurance Project Plan

The Contractor has already developed and has been working under a Quality Assurance Project Plan (QAPP #360), which documents the quality processes and procedures for the types of tasks associated with this project. The Contractor shall update QAPP 360, Section A6, to reflect Tasks 2-5 below, and submit the QAPP for EPA WACOR and QA Manager's approval. The Contractor shall not perform any work on the new tasks under this Work Assignment until the QAPP is reviewed and approved by the EPA WACOR and QA Manager. The QAPP shall include documentation on quality assurance checks to verify accuracy, completeness, and adherence to established format and must address data collection, analysis, and the use of existing (secondary) data that will be used in this project. Guidance for developing QAPPs that meet EPA specifications prepared for activities conducted by or funded by EPA, are available online at http://www.epa.gov/quality/qa_docs.html, see "EPA Requirements for Quality Assurance Project Plans (QA/R-5)".

Deliverable 1a: Work Plan and Cost Proposal **Due:** 14 days after receipt

Deliverable 1b: QAAP **Due:** within 7 days of work plan approval

The Contractor shall not begin Task 2 until the work plan and QAPP are approved.

TASK 2: Expert Consultations on Adaptation Design Tool

The Contractor shall work with the WACOR and Steering Committee (SC) members to plan and carry out expert consultations to "test" the draft Adaptation Design Tool and gather feedback for its improvement. This will involve traveling to the Pacific and Caribbean regions (1 trip per region, for 2

days each) to work with small groups of selected stakeholder/practitioners who are interested in working with a facilitator to run through a test application of the tool using examples from their own management plans. The Contractor shall produce a memo describing the results of both consultations and analyzing the implications of the feedback for revision of the Tool and guidance.

Deliverable 2a: Consultation plans **Due:** November 15, 2015 or earlier

, The Contractor shall develop a plan for each expert consultation while working with the WACOR and selected SC members. This will involve one or more conference calls or meetings between project team members and the selected stakeholders in each region in order to: (1) decide on the dates for the consultations, which may include "piggybacking" the consultation meetings onto existing stakeholder workshops; (2) determine the location and venue for the meetings; (3) agree on reference materials to be assembled in preparation for the meetings; and (4) provide initial orientation on the Tool to the stakeholders in advance of/in preparation for the meetings.

Deliverable 2b: Pacific consult **Due:** TBD after Deliverable 2a

The Contractor shall provide technical and facilitation support to work with the selected stakeholders from the Pacific region on the Tool test. Based on the plan (Deliverable 2a), the Contractor support may include: (1) one or more pre-meeting calls to prepare the stakeholders for the in-person working meeting; (2) assistance to stakeholders in identifying and locating background reference materials that they will need in order to use the Tool; (3) facilitation at the meeting in order to work through the Tool; and (4) recording of notes of stakeholder feedback and discussions.

Deliverable 2c: Caribbean consult **Due:** TBD after Deliverable 2a

The Contractor shall provide technical and facilitation support to work with the selected stakeholders from the Caribbean region on the Tool test. Based on the plan (Deliverable 2a), the Contractor support may include: (1) one or more pre-meeting calls to prepare the stakeholders for the in-person working meeting; (2) assistance to stakeholders in identifying and locating background reference materials that they will need in order to use the Tool; (3) facilitation at the meeting in order to work through the Tool; and (4) recording of notes of stakeholder feedback and discussions.

Deliverable 2d: Memo on implications for revision of tool and guidance **Due:** 2 weeks after Deliverables 23b/c

The Contractor shall prepare a memo summarizing the feedback from the two expert consultations and presenting a synthetic analysis of the implications of the feedback for revision of the Tool and accompanying guidance. This analysis will provide the basis for a revision of the Tool and guidance (see Deliverable 5a) which will be prepared and presented for discussion at the in-person working meeting of the project team (see Task 4) in the spring of 2016.

TASK 3: Response to Comments and Revision of Case Study Manuscript

During the last option period, the Contractor worked in consultation with the WACOR to produce an "internal review draft" (IRD) manuscript presenting the first ("case study") phase of the project. In this task, the Contractor shall work with the WACOR to address reviewers' comments from the EPA internal

review process and produce a revision of the manuscript for submission to a peer-reviewed journal. Upon receipt of reviews of the "external review draft" (ERD) manuscript from the journal's peer-review process, the Contractor shall work with the WAM on the final revisions and publication process. All versions shall be written in clear, concise prose consistent with the standards of peer-reviewed scientific literature.

Deliverable 3a: Respond/revise per IRD comments — **Due:** 4 weeks after WACOR provides IRD comments (fall 2015)

The Contractor shall use the comments received from EPA's internal review process as the basis for a revision of the IRD manuscript. This shall include a summary of responses to comments and a record of resulting changes made to the manuscript. During this process the Contractor shall consult with and obtain feedback from project team members and WACOR as needed.

Deliverable 3b: Submit manuscript to journal for review — **Due:** 1 week after approval of Deliverable 3a

The Contractor shall work with the WACOR to format and submit the revised ERD manuscript to an appropriate peer-reviewed journal for external review.

Deliverable 3c: Respond/revise per ERD comments — **Due:** 4 weeks after ERD comments received

The Contractor shall use the ERD comments received from the journal as the basis for a revision of the manuscript. This shall include a summary of responses to comments and a record of resulting changes made to the manuscript. During this process the Contractor shall consult with and obtain feedback from project team members and WACOR as needed.

Deliverable 3d: Submit manuscript for publication — **Due:** 1 week after Deliverable 3c approved

The Contractor shall work with the WACOR on journal selection, final formatting and submission of the article.

TASK 4: In-Person Working Meeting of the Steering Committee

The Contractor shall assist the WACOR in organizing and facilitating an in-person meeting of the SC in Washington, DC for 2 days in the spring of 2016. SC members are Federal and/or local and will not need travel support; however the Contractor should budget for Contractor staff travel. Travel and lodging arrangements shall be consistent with U.S. government travel, lodging, and per diem allowances. The objectives of the SC meeting will be to: (1) discuss feedback and make revisions to the Design Tool and accompanying guidance based on results of the expert consultations; (2) discuss process, roles and responsibilities for working with outside partners to adapt the Design Tool into an online learning module for widespread use by practitioners; (3) create an annotated outline for the structure and content of a second journal article on the Tool; and (4) lay out a "map" of adaptation planning needs, based on lessons learned, to guide future project work.

Deliverable 4a: Prepare meeting materials — **Due:** 2 weeks before meeting (date TBD)

Working with the WACOR, the Contactor shall prepare meeting materials including: (1) an agenda for the 2 day meeting of the SC; (2) a PowerPoint presentation summarizing feedback from expert consultations (based on Deliverable 2d); and (3) a draft outline for a journal article to present the Tool.

Deliverable 4b: Attend 2 day in-person meeting **Due:** Meeting date TBD (spring 2016)

Appropriate Contractor staff shall attend, present and assist the WAM in facilitating the 2 day working meeting of the SC.

Deliverable 4c: Produce working meeting notes **Due:** 3 weeks after Deliverable 4b

The Contractor shall record notes of the deliberations, discussions and ideas of the SC during the course of the meeting and submit copies to the WACOR for review. The WACOR will provide comments in either written or oral form, and the Contractor shall finalize the meeting notes accordingly.

TASK 5: Revised Adaptation Design Tool with Guidance and IRD Manuscript

Working in consultation with the WACOR and the SC, the Contractor shall revise, enhance and expand upon a draft Adaptation Design Tool that was created in the last option period as a result of feedback and ideas provided by experts at the 2014 stakeholder workshop. This Tool will support in-depth analysis of information for the "identifying adaptation options" component of the larger coral adaptation planning framework and methodology. The revised Tool shall also include revision of accompanying guidance for using the Tool, as well as an IRD manuscript presenting this second phase of the project.

Deliverable 5a: Revise Tool and guidance based on expert consultations **Due:** 4 weeks after Deliverable 3d

Using the memo produced as a result of the expert consultations (Deliverable 2d) as a starting point, the Contractor shall undertake a revision of the Tool and accompanying guidance. A record of the suggested changes, along with justifications for those changes based on the synthesis of expert feedback, should be documented (method of documentation to be decided in consultation with the WACOR) for use when presenting the revised Tool to the project team at the in-person meeting of the SC (see Task 4).

Deliverable 5b: Revise tool and guidance based on in person working meeting **Due:** 4 weeks after Deliverable 4c

Using the feedback and discussions with the full project team at the in-person meeting of the SC (see Task 4) as a starting point, the Contractor shall undertake a revision of the Tool and accompanying guidance. A record of the suggested changes, along with justifications for those changes where needed, should be documented (method of documentation to be decided in consultation with the WACOR) for use when presenting the revised Tool to stakeholders in later presentations and discussions.

Deliverable 5c: Annotated outline of journal article **Due:** 3 weeks after Deliverable 4b

The Contractor shall use the results of Deliverable 5a (revised Tool) and discussions from the in-person working meeting (Task 4) to propose the structure and topical content of a manuscript presenting the Tool, guidance and lessons learned from the second phase of the project. The Contractor shall consult

with the WACOR and SC for feedback as needed.

Deliverable 5d: First draft journal article **Due:** 4 weeks after Deliverable 5b

Based on the annotated outline and feedback from the SC and working in collaboration with the WACOR, the Contractor shall draft a journal article on the Tool, guidance, and lessons learned from the second phase of the project.

Deliverable 5e: Second draft journal article **Due:** 4 weeks after Deliverable 5b

Based on review and feedback from the SC and working in collaboration with the WACOR, the Contractor shall revise and improve the journal article.

Deliverable 5f: IRD journal article **Due:** 4 weeks after Deliverable 5d

Based on feedback from the WACOR and SC, the Contractor shall finalize the IRD article.

MILESTONES AND DELIVERABLES:

Task	Milestone/Deliverable	Due Date
1	**1a Work Plan and Cost Proposal** **1b QAPP**	14 days after receipt of Work Assignment 7 days after approval of 1a
2	**Expert Consultations on Adaptation Design Tool** 2a: Consultation plans 2b: Pacific consult 2c: Caribbean consult 2d: Memo on implications for revision of tool and guidance	 November 15, 2015 or earlier TBD after Deliverable 2a TBD after Deliverable 2a 2 weeks after Deliverables 2b, 2c
3	**Response to IRD Comments and Revision of CCAP Manuscript** 3a: Respond/revise per IRD comments 3b: Submit manuscript 3c: Respond/revise per ERD comments 3d: Submit manuscript for publication	 4 weeks after WAM provides IRD comments (Fall 2015) 1 week after approval of Deliverable 3a 4 weeks after ERD comments received 1 week after Deliverable 3c approved
4	**In-Person Working Meeting** 4a: Prepare meeting materials 4b: Attend 2 day in-person meeting 4c: Working meeting notes	 2 weeks before meeting date (TBD) Meeting date TBD (spring 2016) 3 weeks after Deliverable 4b
5	**Revised Adaptation Design Tool with Guidance and IRD Manuscript** 5a: Revise tool and guidance based on expert consultations 5b: Revise tool and guidance based on in person working meeting 5c: Annotated outline of journal article 5d: First draft journal article 5e: Second draft 5f: IRD journal article	 4 weeks after Deliverable 3d 4 weeks after Deliverable 4c 3 weeks after Deliverable 4b 4 weeks after Deliverable 5c 4 weeks after Deliverable 5d 4 weeks after Deliverable 5e

ACCEPTANCE CRITERIA:

The Contractor shall prepare high quality deliverables in accordance with academic standards. Deliverables shall be edited for grammar, spelling, and logic flow. The technical information shall be reasonably complete and presented in a logical, readable manner. Figures submitted shall be of high quality similar to presentations developed for national scientific forums and should be formatted as jpeg or png files. Text deliverables shall be provided in Microsoft Word 2007 or compatible format.

CONFLICT OF INTEREST:

The Contractor warrants that, to the best of the Contractor's knowledge and belief, that there are no relevant facts or circumstances which could give rise to a conflict of interest, as defined in FAR subpart 9.5, or that the Contractor has disclosed all such relevant information.

The Contractor agrees to notify the Contracting Officer immediately, that to the best of its knowledge and belief, no actual or potential conflict of interest exists or to identify to the Contracting Officer any actual or potential conflict of interest the Contractor may have.

The Contractor agrees that if an actual or potential conflict of interest is identified during the performance, the Contractor shall immediately make a full disclosure in writing to the Contracting Officer. This disclosure shall include a description of actions which the Contractor has taken or proposes to take, after consulting with the Contracting Officer, to avoid, mitigate, or neutralize the actual or potential conflict of interest. The Contractor shall continue performance until notified by the Contracting Officer of any contrary action to be taken.

MANAGEMENT CONTROLS:

1. The EPA will review and provide comments on the Work Plan and QAPP.

2. The EPA will also review and provide comments on all deliverables, with written confirmation of their acceptance required prior to completion of subsequent deliverables.

3. The Contractor shall clearly identify itself as an EPA contractor when acting in fulfillment of this contract. No decision-making activities relating to Agency policy, enforcement or future contracting shall take place if the Contractor is present. If the Contractor has a need to meet with Federal employees on-site, then the Contractor personnel shall visibly wear identification in performance of this contract while on-site that will be issued by the Government upon arrival to the Federal facility.

4. Technical Direction: The WACOR is authorized to provide technical direction that clarifies the statement of work as set forth in this work assignment. Before initiating any action under technical direction, the contractor shall ensure that the technical direction falls within the scope of work for this work assignment. The technical direction shall be issued in writing by the WACORwithin four working days of verbal issuance. This will be forwarded to the CL-COR and CO for their information and necessary actions.

   The CO is the only person authorized to make changes to this work assignment or contract. The changes must have prior approval from the CO in writing as an amendment or modification to the work assignment or contract.

   Technical direction includes direction to the contractor that assists the contractor in accomplishing individual tasks deemed appropriate under the Statement of Work, as well as comments and approval of reports and other deliverables

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance by the Contractor is strictly limited to management and analytical support. The

Contractor shall not engage in activities of an inherently governmental nature such as the following:

1. Formulation of Agency policy
2. Selection of Agency priorities
3. Development of Agency regulations

Should the Contractor receive any instruction from an EPA staff person that the Contractor ascertains to fall into any of these categories or goes beyond the scope of the contract or work assignment, the Contractor shall immediately contact the CL-COR and the Contract Specialist or Officer.

The Contractor shall also ensure that work under this individual work assignment does not contain any apparent or real personal or organizational conflict of interest. The Contractor shall certify that none exists at the time the work plan is submitted to EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-06

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016	Adaptation Planning for Coral
	Base Option Period Number 3	

Contractor: TETRA TECH, INC.

Specify Section and paragraph of Contract SOW: 2e, 2g, 2h, 2i, 2j, 2L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: Adaptation Planning for Coral Reefs

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
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Authorized Work Assignment Ceiling

	Cost/Fee	LOE
Contract Period: 09/30/2012 To 09/29/2016	$0.00	0
This Action:	$99,946.00	735
Total:	$99,946.00	735

Work Plan / Cost Estimate Approvals

	Cost/Fee	LOE
Contractor WP Dated: 10/22/2015	$99,946.00	735
Cumulative Approved:	$99,946.00	735

Work Assignment Manager Name: Jordan West (Signature) (Date)	Branch/Mail Code: Phone Number: 703-347-8584 FAX Number:
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name: (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Cranley (Signature) 10/27/15 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-07

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016	EnviroAtlas
	Base Option Period Number 3	

Contractor: TETRA TECH, INC.

Specify Section and paragraph of Contract SOW: 2a, b, c, g

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
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Authorized Work Assignment Ceiling

	Contract Period:	Cost/Fee:	LOE:
	09/30/2012 To 09/29/2016		
This Action:			
Total:			

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Megan Mehaffey (Signature) (Date)	Branch/Mail Code: Phone Number: 919-541-4205 FAX Number:
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Cranley (Signature) 09/25/15 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

PERFORMANCE WORK STATEMENT
EP-C-12-060
WA 3-07

I. **Title:** EnviroAtlas: Watershed tools, Ecosystem metrics and Ecosystem Browser
EAS Short Title: EnviroAtlas

II. **Period of Performance:** Award through September 29, 2016

III. **COR:**

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IV. ***Goal/Purpose*:** EPA's Office of Research Development and its partners are developing the EnviroAtlas for the Sustainability and Communities Program. The EnviroAtlas is an online decision support tool that allows users to view and analyze the geographical distribution of supply, demand, and drivers of change related to natural and built infrastructure at multiple scales for the nation. Explicit relationships between human health and well-being and the services provided by the ecosystem will communicate a full accounting of how decisions affect communities' progress towards sustainability under different scenarios. Through the EnviroAtlas users will have access to a suite of the metrics.

V. ***Discussion*:** The world around us is changing rapidly - economies, populations, and climate are undergoing major transformations, which require new and updated policies that ensure health, safety, and sustainability in the ways humans interact with the planet. To react to these changes in positive, helpful ways, we need a common understanding, across our country and the world, of the natural sciences and engineered developments that affect our lives. The long-term health and well-being of people is tied to the quality of the natural environment and the manmade places around them: the towns, cities, and rural and natural land areas where they live, work, and play. At present, the many goods and services that we get from nature (ecosystem services) are well-known, but not always kept in mind when decisions are made. Often, decisions on development and environmental policy have been made based on incomplete understanding of the interactions between human activities and ecosystem services. For the well-being of present and future generations, we must understand our needs for sustainable practices and ecosystem services.

VI. ***Tasks*:**

a. **Task 1.** The contractor shall prepare and submit a quality assurance project plan (QAPP) addressing the activities for the tasks that follow. Other project-specific document(s) that discuss quality assurance and/or quality control requirements and procedures, may also be submitted to the WACOR for review and approval before work begins on the project so that all parties have a clear understanding of the project goals, the deliverables and schedule for their submission, and the established quality standards that must be met for the intended use of

the products.

b. **Task 2.** The contractor shall add variables for distance of travel and travel time to the HUC Navigation Tool that is currently in the EnviroAtlas. The contractor shall check that the tool functions properly and is allowing the user to view up or downstream HUCS by either choosing travel time or distance (stream miles). The contractor shall work with EnviroAtlas web-tool developers to upload changes to the tool or notify them of the list of HUCs that are not going to work in the tool.

c. **Task 3**. The contractor shall apply the Revised Universal Soil Loss Equation (RUSLE) model to the CONUS and also modify the equation to derive a quantitative approximation of the ecological services provided by vegetative cover type, management practices, and other surface features with respect to protecting soils from erosion. The contractor shall calculate quantities of soil retained on the landscape as well as potential erosion for multiple scenarios with the first representative of current (NLDC 2011) conditions, other scenarios relating to application of best management practices will be provided by EPA. The contractor shall use the SSURGO soils data provided by EPA, PRISM rainfall data, and National Elevation Data. The contractor shall calculate slope length to be used in RUSLE. The contractor shall provide a gridded 30 m coverage of the results and summarized results aggregated to 12 digit HUCs which will be provided by EPA. The contractor shall apply a method such as SEDMOD to estimate nutrient and sediment loads associated with reduced erosion for each scenario. Output shall be provided as raw raster or shape files and summarized tables as excel, dbf, or csv for HUC12s.

d. **Task 4.** The contractor shall determine for the conterminous U.S. the area and percentage of headwater catchment area within each HUC12. The contractor shall use the most recent version of the NHDPlus V2 data to determine headwater streams. The contractor shall use the version of HUC12 provided by EPA. Output shall be provided as raw raster or shape files and summarized tables as excel, dbf, or csv for HUC12s.

e. **Task 5.** The contractor shall develop and apply the best method for quantifiable methods for modeling climate change effects on specific fish species in terms of thermal changes, gradient barriers (both anthropogenic and natural), precipitation, and stream flow for future development of a national metric. The method should be based on results from the previous WA 2-07 Task 6 literature search. Output shall be provided as raw raster or shape files and summarized tables as excel, dbf, or csv for HUC12s.

f. **Task 6.** The contractor shall conduct an extensive literature search for the purpose of developing an EcoService browser tool centered on the seven benefit categories in the EnviroAtlas and the ecosystems that provide them. The contractor shall draw on previous literature and research done by EPA for development of the two ecosystem classification systems known as FEGS-CS (by Dixon Landers et al) and NESCS (Charles Rhodes et al.) to construct a relationship browser similar in look and feel of the EnviroAtlas EcoHealth browser but focused on linking ecosystems, EnviroAtlas indicators, beneficiaries, benefits, and valuation. The contractor shall develop and apply a method for creating the necessary linkages to develop a browser and an application for viewing the linkages and literature associated. Output shall be provided as an EnviroAtlas-compliant web tool along with the tables to support the tool.

VII. ***Deliverables and Project Schedule*:**

Task #	Deliverable	Due Date
Work Plan	TWP	20 days after receipt of WA
Task 1.QAPP	Quality Assurance Project Plan	30 days after accepted TWP
Task 2.HUCNav Tool	Develop HUC Nav up/downstream and time of travel table	12/30/2015
Task 3 RUSLE/SEDMOD	Collection of data for running RUSLE	01/30/2016
Task 3 RUSLE/SEDMOD	Run RUSLE for nation at HUC12 scale for current and scenarios	03/31/2016
Task 3 RUSLE/SEDMOD	Apply SEDMOD for nutrient/sediment for scenarios	04/30/2016
Task 4 Headwater Steams	Determine area and percent headwaters in HUC12	02/30/2016
Task 5 Fish Indicators	Model climate impacts on select species for nation	03/30/2016
Task 5.Fish Indicators	Summarize fish indicators by HUC12	05/30/2016
Task 6.EcoBrowser	Literature review and FEGCS and NESCS	06/30/2016
Task 6.EcoBrowser	Linkage table for EnviroAtlas Benefit Categories	07/30/2016
Task 6.EcoBrowser	Web based Application Development	09/30/2016

VIII. ***QA/QC Requirements for WA*:** All deliverables will be evaluated as to their quality by the WACOR. Deliverables of unacceptable quality will be returned to the contractor for revision. Spatial data shall meet federal FGDC standards and metadata shall be provided with each deliverable.

EPA National Geospatial Data Policy (NGDP)
Whenever practical and applicable, this research shall adhere to the *EPA National Geospatial Data Policy* (NGDP) which establishes principles, responsibilities, and requirements for collecting and managing geospatial data used by Federal environmental programs and projects within the jurisdiction of the U.S. Environmental Protection Agency (EPA). This Policy also establishes the requirement of collecting and managing geospatial metadata describing the Agency's geospatial assets to underscore EPA's commitment to data sharing, promoting secondary data use, and supporting the National Spatial Data Infrastructure (NSDI). Reference: USEPA. US Environmental Protection Agency, CIO Policy Transmittal 05-022, Classification No. 2121, Policy Title: *EPA National Geospatial Data Policy*, http://www.epa.gov/nerlesd1/gqc/pdf/epa_natl_geo_data_policy.pdf August 24, 2005 [URL cited September 29, 2011].

EPA National Geospatial Data Policy Procedure for Geospatial Metadata Management
Whenever practical and applicable, this research shall adhere to the *EPA National Geospatial Data Policy Procedure for Geospatial Metadata Management* which establish procedures, requirements and responsibilities to implement a data life cycle, as defined in the National Geospatial Data Policy (NGDP), for all geospatial metadata used by federal environmental programs and projects within the jurisdiction of the U.S. Environmental Protection Agency (EPA). Reference: USEPA. US Environmental Protection Agency, CIO Policy Transmittal 08-004, Classification No. CIO 2131-P-01-0, Policy Title: *EPA National Geospatial Data Policy Procedure for Geospatial Metadata Management,* http://www.epa.gov/geospatial/docs/2131.pdf October 25, 2007 [URL cited September 29, 2011].

IX. ***Reports and Meetings:*** Periodic conference calls (e.g. every 2 weeks) to review status of the deliverable will be scheduled by EPA. No additional reports are needed beyond those automatically provided. Requirements for meeting with task manager can occur by phone as needed to address technical questions.

	Need (Yes/No)	Purpose	Frequency
	yes	to discuss work plan	once
	yes	to review data, analyses, or NGI metric development	as-needed
	no	to review monthly cost report	Monthly
	yes	to review quarterly progress report	quarterly
		other:	

X. ***Travel/Training Requirements (include destination/dates/purpose):*** No travel is anticipated with this WA.

XI. Management Controls:

Technical Direction: The WACOR is authorized to provide technical direction that clarifies the statement of work as set forth in this work assignment. Before initiating any action under technical direction, the contractor shall ensure that the technical direction falls within the scope of work for this work assignment. The technical direction shall be issued in writing by the WACOR within four working days of verbal issuance. This will be forwarded to the CL-COR and CO for their information and necessary actions. The CO is the only person authorized to make changes to this work assignment or contract. The changes must have prior approval from the CO in writing as an amendment or modification to the work assignment or contract. Technical direction includes direction to the contractor that assists the contractor in accomplishing individual tasks deemed appropriate under the Performance Work Statement, as well as comments and approval of reports and other deliverables

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-07

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3 .	EnviroAtlas

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2a, b, c, g

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:

[ ] Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee:	LOE:
Contract Period: 09/30/2012 To 09/29/2016	$0.00	0
This Action:	$105,728.00	1,055
Total:	$105,728.00	1,055

Work Plan / Cost Estimate Approvals

Contractor WP Dated: 10/15/2015	Cost/Fee:	$105,728.00	LOE: 1,055
Cumulative Approved:	Cost/Fee:	$105,728.00	LOE: 1,055

Work Assignment Manager Name: Megan Mehaffey (Signature) (Date)	Branch/Mail Code:	
	Phone Number	919-541-4205
	FAX Number:	
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	513-569-7920
	FAX Number:	
Other Agency Official Name (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	
	FAX Number:	
Contracting Official Name: Mark Cranley (Signature) 10/27/15 (Date)	Branch/Mail Code:	CPOD
	Phone Number:	513-487-2351
	FAX Number:	513-487-2109

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-08

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016	Ecosystem Goods & Services
	Base Option Period Number 3	

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2g, 2h, 2j, 2k

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 01/25/2016 To 09/29/2016

Comments:

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (*Max 2*) ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period: 09/30/2012 To 09/29/2016 — Cost/Fee: — LOE:

This Action:

Total:

Work Plan / Cost Estimate Approvals

Contractor WP Dated: — Cost/Fee — LOE:

Cumulative Approved: — Cost/Fee — LOE:

Work Assignment Manager Name Michael Kravitz	(Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7740 FAX Number:
Project Officer Name Ruth Corn	(Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name	(Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name Mark Cranbey	(Signature) 02/03/16 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

Performance Work Statement

Tetra Tech, Inc.
Contract EP-C-12-060
Work Assignment No. 3-08

TITLE: Understanding and Evaluating Ecosystem Goods and Services (EGS) at Site Remediation Projects

EAS Short Title: Ecosystem Goods & Services (EGS)

PERIOD OF PERFORMANCE: Award date through September 29, 2016

WORK ASSIGNMENT COR (WACOR):

Michael Kravitz
U.S. Environmental Protection Agency
Office of Research and Development
National Center for Environmental Assessment
Ecological Risk Assessment Support Center
26 W. M. L. King Drive
Cincinnati, OH 45268
513-569-7740 (voice)
513-487-2541 (fax)
kravitz.michael@epa.gov (email)

ALTERNATE WACOR:

Michael McManus
U.S. Environmental Protection Agency
Office of Research and Development
National Center for Environmental Assessment
Ecological Risk Assessment Support Center
26 W. M. L. King Drive
Cincinnati, OH 45268
513-569-7994 (voice)
513-487-2541 (fax)

BACKGROUND:

Superfund seeks to better integrate consideration of ecosystem goods and services (EGS) when implementing its core mission of protecting human health and the environment at contaminated sites. Superfund remediation projects are often large construction operations with a significant environmental footprint. Since 2012, the Superfund Program has implemented a greener cleanups strategy seeking to reduce the environmental footprint of site cleanups. One of the actions completed under the strategy is the release of EPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 542-R-12-002, February 2012), which provides an approach to quantify energy, air, water, and materials & waste that comprise the

environmental footprint of implementing a remedy. A project manager conducts a quantitative footprint assessment to better understand the nature and scale of key contributors to a remedy's environmental footprint, and in that way target footprint reduction best management practices (BMPs). When completed in 2012, the methodology suggested the use of qualitative descriptions of the effects of a remedy on EGS at a site, but did not provide metrics or a means of quantifying such services. The work performed by the Contractor under this contract Performance Work Statement (PWS) will start addressing that gap by defining metrics for quantifying EGS impacted by site cleanup and reuse activities. Valuation of EGS is an important tool for describing the importance of healthy ecosystems on human well-being and quantifying EGS has been identified as a new component in future activities involving risk assessment approaches (Munns et al., 2015). Research on site remediation indicates that early evaluation of EGS plays an important role in creating remediation and reuse plans. A replicable tool for identifying and measuring EGS provided from contaminated site remediation is needed. The value of EGS can be viewed from many perspectives, including ecological, economic, philosophical, and psychological.

OBJECTIVES

Superfund seeks to better integrate consideration of EGS when implementing its core mission of protecting human health and the environment at contaminated sites. Our interest is in improving Best Management Practices (BMPs) to mitigate impacts on EGS during remedy construction and operations. This work would also assist in identifying how EGS can be incorporated into the site restoration and reuse planning. A more robust assessment can facilitate dialogue with communities and other stakeholders in planning site operations and reaching the final outcome of the site cleanup.

Encouraging greener cleanups strategies and integrating ecological restoration into remedial activities directly impacts the provision of EGS that result in a direct uplift to public health. It provides benefits that can be explained to the community and stakeholders. Habitats that can be created, restored, and enhanced improve public health in a variety of ways. For example, wetlands filters sequester and detoxify contaminants from drinking water sources; wooded areas and grasslands produce clean air and sequester carbon; meadows provide habitat for pollinators which are essential for our crops and biodiversity. Ecological restoration can include species that directly provide goods to improve the nutrition of the local community. Habitat planning can include trees and shrubs from which edible fresh nuts, fruits and berries can be harvested and birds can live. The anticipated assessment and planning tools will highlight how the specific ecosystem goods and services provided by the BMPs and habitats directly benefit community and public health.

Drawing from existing sources, EPA will prepare a general fact sheet, "Understanding EGS at Superfund Cleanups," that defines EGS terminology in the context of Superfund cleanup decisions and the approach for conducting a screening level analysis of EGS that may be present at a site and/or impacted by remedial actions.

Based on information in the fact sheet, as well as information from EnviroAtlas and other sources, including those recommended by EPA, the Contractor shall conduct an EGS analysis at two pilot sites and analyze how site remedy operations may impact such services. [The two currently active NPL sites represent different ecosystems and scales: a large (watershed scale) site in a natural undeveloped setting in the Rocky Mountain west (Lower Basin of the Coeur d'Alene River, Coeur D'Alene, ID) and a (relatively) smaller site in an east coast urban setting (Lower Darby Creek Area, in metropolitan Philadelphia PA).] As part of this work, the Contractor shall also determine 1) how BMPs can be used to mitigate potential impacts of remedy operations and enhance EGS for site restoration and reuse planning, and 2) what EGS may be created or improved through ecological reuse of the cleaned up site. The Contractor shall also keep track of lessons learned, particularly as related to the differences between the sites.

EPA will use the Contractor's deliverable to develop a methodology for EGS evaluation that can be applied to other Superfund sites. Protocols will be developed to help project managers of Superfund sites incorporate EGS evaluations into project management through describing the main steps to be followed:

1. How to estimate current production of EGS at a site to define baseline.
2. How to evaluate possible impacts remedial and other site activities may have on EGS, and how production and benefits of these services may be reduced or sustained under various decision scenarios.
3. How to identify and prioritize best practices to mitigate such impacts, and to "prime" the site for revitalization of EGS on completion of remedial activities, and into reuse or revitalization phases.

In addition, EPA, will build a use case for EnviroAtlas from lessons learned to help promote the use of the methodology at other contaminated sites.

The Ecological Risk Assessment Support Center (ERASC) and the OSWER Engineering Forum, with assistance from Superfund ecological risk assessors (Ecological Risk Assessment Forum), will be used to help translate and distribute findings from these research efforts.

QUALITY ASSURANCE

The tasks in this work assignment require the use of secondary data. All QA activities shall be in conformance with EPA's Requirements for Quality Assurance Project Plans (EPA QA/R-5) "http://www.epa.gov/quality/qs-docs/r5-final.pdf" and should demonstrate a clear understanding of the project's goals/objectives/questions and issues. Documentation of all analyses shall also indicate how types, quantity, quality of data have been quality assured and maintained. In particular, the quality assurance report shall also ensure that metadata is compiled in an easy to use format. All products should be detailed so that the decisions and analysis are completely transparent to a third party. The contractor shall alert the COR regarding any quality issues should they arise.

The contractor shall develop a Quality Assurance Project Plan (QAPP) in accordance with *U.S. EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5), and provide to the COR and the NCEA QA Manager in electronic form for approval, when the Work Plan and cost estimate are submitted. The QAPP should address data collection, analysis, and the use of existing data. Existing data are defined as data that were developed for a different purpose and include data found in the published literature. Guidance for developing a QAPP can be found in: *Guidance for Quality Assurance Project Plans* (EPA QA/G-5), and guidance for addressing existing data can be found in Table 9 of the EPA/G-5 document.

The guidance documents are publicly available:

http://www2.epa.gov/sites/production/files/2015-07/documents/r5-final.pdf

http://www2.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5

The Contractor shall not perform any work on subsequent tasks under this Work Statement until the Work Plan and QAPP are reviewed and approved. The QA activities should comprise no more than 5% of the total effort.

SCOPE OF WORK

The purpose of this work assignment is to obtain contractor services to provide technical support to the EPA Regions 3, 9, and 10 RESES project, *Understanding and Evaluating EGS at Site Remediation Projects and Applying Their Benefits to Sustainability and Livability for Surrounding Communities*. The specific tasks are defined below. Technical direction will be provided to the contractor for clarification purposes through written communication provided by the EPA WACOR using technical direction memoranda. Any technical direction (verbal or written) shall be provided to the CL-COR/CO within 3 days.

Task 1: Prepare Work Plan, Monthly Progress Reports, and Comply with EPA Information Quality Guidelines

The contractor shall:

a) Develop a work plan to address all tasks in this work assignment. The work plan must include a schedule, staffing plan, level of effort (LOE), cost estimate, the contractor's key assumptions on which staffing plan and budget are based, and qualifications of proposed staff. If a subcontractor(s) is proposed, the contractor must include information on plans to manage work and contract costs. All P levels, hours and totals shall be provided and costs greater than $100.00 must be itemized in detail. The contractor must provide the job number with all invoices to facilitate their expediency.

Work plan	Within 15 business days after receipt of work assignment

b) Provide monthly progress and financial reports. The monthly progress report shall indicate, in a separate QA section, whether significant QA issues have been identified and how they are being resolved. Monthly financial reports must include a table with the invoice LOE and costs broken out by the tasks in this WA.

Monthly Progress and Financial Reports	Monthly

Task 2: Conduct an EGS evaluation for the two Superfund sites using all existing resources.

The contractor shall:

a) Based on information in the fact sheet, as well as information from EnviroAtlas and other sources, including those recommended by EPA, conduct an EGS analysis at two pilot sites and analyze how site remedy operations may impact such services. As part of this work, determine 1) how BMPs can be used to mitigate potential impacts of remedy operations and enhance EGS for site restoration and reuse planning, and 2) what EGS may be created or improved through ecological reuse of the cleaned up site.

Examples of sources of information include the following:

Munns, WR, Jr., AW Rea, GW Suter II, L Martin, L Blake-Hedges, T Crk, C Davis, G Ferreira, S Jordan, M Mahoney, MG Barron. 2015. *Ecosystem Services as Assessment Endpoints for Ecological Risk Assessment.* Integrated Environmental Assessment and Management DOI 10.1002/ieam.1707.

US EPA Risk Assessment Forum. *Ecosystems Services as Assessment Endpoints in Ecological Risk Assessment. Risk Assessment Forum Technical Background Paper* (Interagency Review).

US EPA Risk Assessment Forum. *Generic Ecological Assessment Endpoints (GEAEs) for Ecological Risk Assessment: Second Edition with Generic Ecosystems Services Endpoints Added* (Interagency Review).

Adamus, P.R. 2011. Manual for the Wetland Ecosystem Services Protocol for the United States (WESPUS). www.oregonstate.edu/~adamusp/WESPUS.

Bagstad K, Semmens D, Waage S, Winthrop R (2013) A comparative assessment of decision-support tools for ecosystem services quantification and valuation. *Ecosyst Serv* 5.

Berghöfer A., A. Wittich, H. Wittmer, J. Rode, L. Emerton, M. Kosmus, H. van Zyl, 2015. Analysis of 19 ecosystem service assessments for different purposes – insights from practical experience. ValuES Project Report. Helmholtz Zentrum für

Umweltforschung (UFZ) GmbH, Leipzig, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Eschborn. Germany. 27pp. http://aboutvalues.net/case_studies/

U.S. Environmental Protection Agency, Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites. April 2008. (EPA 542-R-08-002).

U.S. Environmental Protection Agency. 2012. Methodology for Understanding and Reducing a Project's Environmental Footprint. EPA 542-R-12-002.

Council of Environmental Quality. 2015. Incorporating Ecosystem Services into Federal Decision Making. M-16-01. Executive Office of the President of the United States.

DH Landers and Nahlik AM. 2013. *Final Ecosystem Goods and Services Classification System (FEGS-CS).* EPA/600/R-13/ORD-004914. U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Final Ecosystem Goods and Services Classification System (FEGS-CS) Website. 2015. U.S. Environmental Protection Agency. http://gispub4.epa.gov/FEGS/FEGS_home.html

ASTM Standard Guide for Greener Cleanups (E2893-13)

U.S Environmental Protection Agency. 2015. *EnviroAtlas.* http://enviroatlas.epa.gov/enviroatlas/atlas.html.

U.S. Environmental Protection Agency. 2015. EcoService Models Library. http://www2.epa.gov/eco-research/ecoservice-models-library.

U.S. EPA ORD ESRP. 2012. Decision Support Framework Implementation of the Web-Based Environmental Decision Analysis Application DASEES: Decision Analysis for a Sustainable Environment, Economy, and Society. EPA /600/R-12/008.

Slack, S. 2010. *The Incorporation of an Ecosystem Services Assessment into the Remediation of Contaminated Sites.* National Network for Environmental Management Studies.

b) Clearly articulate the tools considered and thought process involved in conducting their EGS analyses.

c) Keep track of lessons learned, particularly as related to the differences between the sites.

The Contractor shall develop a rough draft. Following comments from the WACOR, a final section will be prepared.

Deliverable: Final Report

TRAVEL

Two trips are envisioned for this work assignment: one trip to each of the two pilot sites. The trip to Coeur D'Alene, ID would entail a two-night stay.

SPECIAL REPORTING REQUIREMENTS

Following Work Assignment approval, the Contractor work assignment leader (WAL) shall maintain communication with the EPA WACOR on a biweekly basis through email, telephone, or in writing. The contractor shall contact the work assignment COR by phone with any questions or problems as soon as they arise to ensure rapid resolution. Any technical direction must be documented and a copy sent to the Contracting Officer and CL-COR.

Written monthly progress reports must be detailed, split into specific tasks to support billings, and document any/all QA/QC procedures performed during the reporting period.

Deliverables will be submitted in electronic form, with electronic word processing, spreadsheet, statistical and graphics files submitted in software format designated by the EPA WACOR.

CONFLICT OF INTEREST

The Contractor warrants that, to the best of the Contractor's knowledge and belief, that there are no relevant facts or circumstances which could give rise to a conflict of interest, as defined in FAR subpart 9.5, or that the Contractor has disclosed all such relevant information.

The Contractor agrees to notify the Contracting Officer immediately, that to the best of its knowledge and belief, no actual or potential conflict of interest exists or to identify to the Contracting Officer any actual or potential conflict of interest the Contractor may have.

The Contractor agrees that if an actual or potential conflict of interest is identified during the performance, the Contractor shall immediately make a full disclosure in writing to the Contracting Officer. This disclosure shall include a description of actions which the Contractor has taken or proposes to take, after consulting with the Contracting Officer, to avoid, mitigate, or neutralize the actual or potential conflict of interest. The Contractor shall continue performance until notified by the Contracting Officer of any contrary action to be taken.

MANAGEMENT CONTROLS

1. The EPA will review and provide comments on the Work Plan and QAPP.

2. The EPA will also review and provide comments on subsequent deliverables.

3. The Contractor shall clearly identify itself as an EPA contractor when acting in fulfillment of this contract. No decision-making activities relating to Agency policy, enforcement or future contracting shall take place if the Contractor is present. If the Contractor has a need to meet with Federal employees on-site, then the Contractor personnel shall visibly wear identification in performance of this contract while on-site that will be issued by the Government upon arrival to the Federal facility.

4. Technical Direction: The WACOR is authorized to provide technical direction that clarifies the statement of work as set forth in this work assignment. Before initiating any action under technical direction, the contractor shall ensure that the technical direction falls within the scope of work for this work assignment. The technical direction shall be issued in writing by the WACOR within four working days of verbal issuance. This will be forwarded to the CL-COR and CO for their information and necessary actions.

The CO is the only person authorized to make changes to this work assignment or contract. The changes must have prior approval from the CO in writing as an amendment or modification to the work assignment or contract.

Technical direction includes direction to the contractor that assists the contractor in accomplishing individual tasks deemed appropriate under the PWS, as well as comments and approval of reports and other deliverables

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT

Guidance by the Contractor is strictly limited to management and analytical support. The Contractor shall not engage in activities of an inherently governmental nature such as the following:

1. Formulation of Agency policy
2. Selection of Agency priorities
3. Development of Agency regulations

Should the Contractor receive any instruction from an EPA staff person that the Contractor ascertains to fall into any of these categories or goes beyond the scope of the contractor or work assignment, the Contractor shall immediately contact the CL-COR and the Contract Specialist or Contract Officer.

The Contractor shall also ensure that work under this individual work assignment does not contain any apparent or real personal or organizational conflict of interest. The Contractor shall certify that none exists at the time the work plan is submitted to EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-08

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	Ecosystem Goods & Services

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2g, 2h, 2j, 2k

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 01/25/2016 To 09/29/2016

Comments:

[ ] Superfund — Accounting and Appropriations Data — [X] Non-Superfund

SFO (Max 2): [ ]

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee	LOE
Contract Period: 09/30/2012 To 09/29/2016	$0.00	0
This Action:	$68,047.00	596
Total:	$68,047.00	596

Work Plan / Cost Estimate Approvals

	Cost/Fee	LOE
Contractor WP Dated: 02/22/2016	$68,047.00	596
Cumulative Approved:	$68,047.00	596

Work Assignment Manager Name: Michael Kravitz (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	513-569-7740
	FAX Number:	
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	513-569-7920
	FAX Number:	
Other Agency Official Name (Signature) (Date)	Branch/Mail Code:	
	Phone Number:	
	FAX Number:	
Contracting Official Name: Mark Cranley (Signature) 03/11/16 (Date)	Branch/Mail Code:	CPOD
	Phone Number:	513-487-2351
	FAX Number:	513-487-2109

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-09

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	BCG Model for Coral Reff Ecosy

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2A, C, D, L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: BCG Model for Coral Reef Ecosystems

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

SFO (Max 2) ☐

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee	LOE
Contract Period: 09/30/2012 To 09/29/2016		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

	Cost/Fee	LOE
Contractor WP Dated:		
Cumulative Approved:		

Work Assignment Manager Name: Susank Jackson	(Signature)	(Date)	Branch/Mail Code: Phone Number: 202-566-1112 FAX Number:
Project Officer Name: Ruth Corn	(Signature)	(Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name	(Signature)	(Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Crawley	Mark Crawley (Signature)	04/12/16 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

PERFORMANCE WORK STATEMENT

Tetra Tech, Inc.
Contract EP-C-12-060
Work Assignment No. 3-09

TITLE: Development of Biological Condition Gradient Model for Coral Reef Ecosystems

EAS Title: BCG Model for Coral Reef Ecosystems

PERIOD OF PERFORMANCE: Award date through September 29, 2016

WORK ASSIGNMENT COR: **Susan Jackson**
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Office of Science and Technology
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ALT WORK ASSIGNMENT COR: **Janice Alers-Garcia**
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TECHNICAL CONTACT: **Deborah L. Santavy, PhD**
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INTRODUCTION

The Clean Water Act (CWA) directs the U.S. Environmental Protection Agency (EPA) to restore and maintain the biological integrity of the Nation's waters. Under the CWA, the EPA has established a Water Quality Standards (WQS) Program to help achieve this objective. The EPA is developing and testing methods to support incorporation of bioassessment information and ecological risk methods into EPA, State and Tribal Water Quality Management Programs including methods to more precisely define designated aquatic life uses and establish biological criteria. EPA is updating current technical guidance and recommended methods for state and tribal water quality programs to incorporate advancements in science and to facilitate technology transfer among states and tribes of best practices. The purpose of this work assignment is to support application of the biological condition gradient (BCG) model to coral reef ecosystems within a decision science framework. The BCG model is a field-based stressor response model that has been developed and applied to freshwater streams in the U.S. (USEPA 810-R-11-01, EPA 820-R-13-001, http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/biocriteria/technical_index.cfm).

OBJECTIVES
In response to this performance work statement (PWS), the Contractor shall carry out several tasks related to the development of the BCG model for coral reef ecosystems. The tasks include refinement of draft classification and decision rules for assigning sample sites to a biological response stressor model (the biological condition gradient). A narrative biological condition gradient model and preliminary classification and decision rules were developed by an expert panel in two experts meetings, the first in August 2012 and the second in April 2014. Preliminary model and rules have been further refined and independently tested by the experts in webinars following each meeting.

This PWS requests that the Contractor shall perform the following activities:

SPECIFIC TASKS:

Task 1: Work Plan, Cost Estimate and Quality Assurance Plan

Task 1a: Prepare Work Plan and Cost Estimate

The Contractor shall prepare a work plan in response to this work assignment: outlining the proposed approach; expertise and staffing, and resources needed; and a schedule to complete each task. The work plan shall identify potential data and tools needed and any potential problems that might be encountered during the execution of the work assignment. It is recommended that the Contractor shall review the EPA publications cited in the introduction to develop a general understanding of the BCG model and its role in water quality management programs.

Task 1b: Develop a QA plan and final QA report

The Contractor shall update the QA plan developed for this same contract. The QA plan detailed the process for searching, extracting, quality assuring the literature and the search process. The Contractor shall also include QA steps to ensure that any literature searches or secondary data analysis are complete and well documented.

Deliverable 1a:
Work Plan and Cost Proposal — **Due:** 15 days after receipt

Deliverable 1b:
Updated QA Plan — **Due:** within 7 days of work plan approval

The Contractor shall not begin Task 2 until the work plan is approved and Task 3 until the updated QA plan is approved.

Task 2: Establish and Maintain Communication

Within seven days after work plan approval, the Contractor shall schedule a conference call, not to exceed 1 hour, with the EPA Work Assignment COR (WACOR) and appropriate Contractor staff to clarify outstanding questions and confirm the schedule and specific tasks. The Contractor shall provide verbal status updates to the WAM every month. The Contractor shall initiate additional communication with the WACOR should developments arise that may affect the conduct or schedule of the module development.

Deliverable 2:
Conference Call — **Due:** within 7 days of work plan approval

Task 3: Develop draft BCG model and decision rules for reef classification and sampling site

assignment.

The Contractor shall provide technical support to refine draft decision rules that were developed at the October 2015 expert panel. These rules provide the technical basis for assigning sampling sites to biological condition levels. Two sets of decision rules, one for coral communities and one for reef fish communities, were developed by subject matter experts at the meeting and in follow up webinars (EP-C-12-060, Work Plan 2-09). The contractor shall provide technical support on the following tasks:

Deliverable 3a:

Revised draft quantitative decision rules for coral reef classification and assigning sites to BCG condition levels for both coral community and reef fish assemblages	**Due**: within 12 weeks of workplan approval

Deliverable 3b:

List of outstanding technical issues and options	**Due**: within 12 weeks of workplan approval

Task 4: Develop draft decision framework to link BCG model with causal analysis

Based on expert panel development of narrative decision rules (Task 3), the Contractor shall provide technical support to develop a draft decision framework and approach to quantitatively link the coral reef BCG model with causal analysis. The contractor shall provide technical support to identify BCG attributes, indicators and monitoring framework to quantify the generalized stressor axis (GSA) of the BCG model, to assist in defining designated aquatic life uses and expedite causal analysis when a coral reef system is assessed under any one of the three following scenarios:

- A reef is assessed in excellent or good condition and the management goal is protection of the reef with specific actions identified to prevent degradation
- A reef is assessed in good condition but threatened by pollutants or pollution and the management goal is to prevent further degradation and, where feasible, improve conditions to excellent with specific actions identified to lessen the impacts of, or eliminate, the pollutants or pollution that are the source of threat to the reef.
- A reef is assessed as fair or poor condition, and the management goal is to improve condition with specific actions identified to reverse the decline.

The USEPA is compiling data from stressors or categories of stressors from existing GIS, land use and water quality data sets for purpose of developing a generalized stressor gradient model for coral reef ecosystems in the estuarine and near coastal waters of Puerto Rico. The data sets include information and indicators on land-based stressors (nutrients, sediments, toxics), fishing pressure, and climate change related stressors (sea surface temperature and pH). Information and data from additional stressor categories may include physical damage (from groundings, anchors, fishing gear and diver/snorkeler contact) and elevated sea levels. Using this data, the contractor shall provide technical support to evaluate the relationship between the BCG attributes and levels (task 3) with individual stressors or categories of stressors and develop a GSA based on technical approach recommended in *A Practitioner's Guide to the Biological Condition Gradient: A Framework to Describe Incremental Change in Aquatic Ecosystems* (EPA 842-R-16-001). The contractor shall provide technical support to develop a GSA based on this analysis.

Deliverable 4:

Draft Generalized Stressor Axis	**Due September 1, 2016**

Task 5: Meetings and Monthly Reports

Meetings or conference calls shall occur as needed to resolve uncertainties or correct problems that may occur, and the Contractor shall provide verbal status updates to the WACOR every month. The frequency of these meetings may be adjusted according to the needs of the project, and the Contractor shall initiate additional communication with the WACOR should developments arise that will affect the conduct or schedule of the other tasks. The Contractor shall prepare very brief minutes of meetings with the EPA staff and monthly status reports. The EPA will review the minutes to ensure that an accurate record of the communications has been made and filed.

Deliverable 5:
Reports **Monthly and more frequent as needed**

MILESTONES AND DELIVERABLES:

Task	Milestone/Deliverable	Due Date
1	**Work Plan, Cost Estimate and QA Plan**	
A	**Work Plan and Cost Estimate**	Within 15 days of receipt of WA
B	**Updated QA Plan**	Within 7 days after WP approval
2	**Establish communication**	Within 7 days after WP approval
3	**BCG Model and Decision Rules**	
A.	Draft Decision Rules revised to address October 2015 expert meeting outcome	12 weeks after workplan approved by WAM
B.	Outstanding Technical Issues and Options to Resolve	12 weeks after workplan approved by WAM
4	**Draft Decision Framework to link BCG model and causal analysis**	
	Draft generalized stressor gradient with supporting statistical analysis	September 15, 2016
5	**Meetings and Monthly Reports**	Monthly

Travel:

There is no travel associated with this work assignment.

ACCEPTANCE CRITERIA:

The Contractor shall prepare high quality reports, models and decision criteria in accordance with the examples already available on the EPA website. The report, model and decision criteria shall be edited for grammar, spelling, and logic flow. The technical information shall be reasonably complete and presented in a logical, readable manner. Figures submitted shall be of high quality similar to presentations developed for national scientific forums and should be formatted as jpeg or png files. Text deliverables shall be provided in MS Office 2013 or compatible format.

CONFLICT OF INTEREST:

The Contractor warrants that, to the best of the Contractor's knowledge and belief, that there are no relevant facts or circumstances which could give rise to a conflict of interest, as defined in FAR subpart 9.5, or that the Contractor has disclosed all such relevant information.

The Contractor agrees to notify the Contracting Officer immediately, that to the best of its knowledge and belief, no actual or potential conflict of interest exists or to identify to the Contracting Officer any actual or potential conflict of interest the Contractor may have.

The Contractor agrees that if an actual or potential conflict of interest is identified during the performance, the Contractor shall immediately make a full disclosure in writing to the Contracting Officer. This disclosure shall include a description of actions which the Contractor has taken or proposes to take, after consulting with the Contracting Officer, to avoid, mitigate, or neutralize the actual or potential conflict of interest. The Contractor shall continue performance until notified by the Contracting Officer of any contrary action to be taken.

MANAGEMENT CONTROLS:

1. The EPA will review and provide comments on the Work Plan and QAPP.

2. The EPA will also review and provide comments on the subsequent module outlines, module drafts, and conceptual models for each of the candidate causes.

3. The Contractor shall clearly identify itself as an EPA contractor when acting in fulfillment of this contract. No decision-making activities relating to Agency policy, enforcement or future contracting shall take place if the Contractor is present. If the Contractor has a need to meet with Federal employees on-site, then the Contractor personnel shall visibly wear identification in performance of this contract while on-site that will be issued by the Government upon arrival to the Federal facility.

4. Technical Direction: The WACOR is authorized to provide technical direction that clarifies the statement of work as set forth in this work assignment. Before initiating any action under technical direction, the Contractor shall ensure that the technical direction falls within the scope of work for this work assignment. The technical direction shall be issued in writing by the WACOR within four working days of verbal issuance. This will be forwarded to the CL-COR and CO for their information and necessary actions.

   The CO is the only person authorized to make changes to this work assignment or contract. The changes must have prior approval from the CO in writing as an amendment or modification to the work assignment or contract.

   Technical direction includes direction to the Contractor that assists the Contractor in accomplishing individual tasks deemed appropriate under the PWS, as well as comments and approval of reports and other deliverables

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance by the Contractor is strictly limited to management and analytical support. The Contractor shall not engage in activities of an inherently governmental nature such as the following:

1. Formulation of Agency policy
2. Selection of Agency priorities
3. Development of Agency regulations

Should the Contractor receive any instruction from an EPA staff person that the Contractor ascertains to fall into any of these categories or goes beyond the scope of the Contractor or work assignment, the Contractor shall immediately contact the CL-COR or the Contract Specialist or Contract Officer.

The Contractor shall also ensure that work under this individual work assignment does not contain any apparent or real personal or organizational conflict of interest. The Contractor shall certify that none exists at the time the work plan is submitted to EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-09

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	BCG Model for Coral Reef Ecosy

Contractor	Specify Section and paragraph of Contract SOW
TETRA TECH, INC.	2A, C, D,L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: BCG Model for Coral Reef Ecosystems

[ ] Superfund — Accounting and Appropriations Data — [X] Non-Superfund

SFO (Max 2) [ ]

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee	LOE
Contract Period: 09/30/2012 To 09/29/2016	$0.00	0
This Action:	$25,921.00	223
Total:	$25,921.00	223

Work Plan / Cost Estimate Approvals

Contractor WP Dated: 04/15/2016	Cost/Fee	$25,921.00	LOE: 223
Cumulative Approved:	Cost/Fee	$25,921.00	LOE: 223

Work Assignment Manager Name: Susank Jackson	(Signature)	(Date)
Project Officer Name: Ruth Corn	(Signature)	(Date)
Other Agency Official Name	(Signature)	(Date)
Contracting Official Name: Mark Cranley	Mark Cranley (Signature)	05/04/16 (Date)

Branch/Mail Code:
Phone Number: 202-566-1112
FAX Number:

Branch/Mail Code:
Phone Number: 513-569-7920
FAX Number:

Branch/Mail Code:
Phone Number:
FAX Number:

Branch/Mail Code: CPOD
Phone Number: 513-487-2351
FAX Number: 513-487-2109

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-10

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	EPA Region 10 Climate Change a

Contractor: TETRA TECH, INC.

Specify Section and paragraph of Contract SOW: 2a, c, e, g, h, i, L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [ ] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: EPA Region 10 Climate Change and TMDL Pilot

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period:	Cost/Fee:	LOE:
09/30/2012 To 09/29/2016		
This Action:		
Total:		

Work Plan / Cost Estimate Approvals

Contractor WP Dated:	Cost/Fee:	LOE:
Cumulative Approved:	Cost/Fee:	LOE:

Work Assignment Manager Name: Steve Klein (Signature) (Date)	Branch/Mail Code: Phone Number: 541-754-4858 FAX Number:
Project Officer Name: Ruth Corn (Signature) (Date)	Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name (Signature) (Date)	Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Cranley (Signature) 09/25/15 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109

PERFORMANCE WORK STATEMENT
Tetra Tech, Inc.
Contract EP-C-12-060
Work Assignment No. 3-10

TITLE: EPA Region 10 Climate Change and TMDL Pilot

PERIOD OF PERFORMANCE: Award date through September 29, 2016

WORK ASSIGNMENT COR: Steven L. Klein
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Corvallis, OR
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klein.steve@epa.gov (E-mail)

ALTERNATE WACOR : Paul M. Mayer, Ph.D.
541-754-4673 (voice)
541-754-4799 (fax)
mayer.paul@epa.gov (E-mail)

INTRODUCTION

Global climate change affects the fundamental drivers of the hydrological cycle. Evidence is growing that climate change will have significant ramifications for the nation's freshwater ecosystems, as deviations in atmospheric temperature and precipitation patterns are more frequently recorded across the United States (Bates et al. 2008; Karl et al. 2009). For example, stream temperature is projected to increase in most rivers under climate change scenarios due in part to increases in air temperature, which, in turn, could adversely affect coldwater fish species such as salmon (Brekke et al. 2009). It is critical that watershed management, planning, and regulatory approaches incorporate climate change science and understanding to ensure holistic and accurate analysis.

The total maximum daily load (TMDL) program is one of the primary frameworks for the nation to maintain and achieve healthy waterbodies, implemented pursuant to section 303(d) of the Clean Water Act (CWA). More than 40,000 TMDLs have been developed in the United States to determine the maximum pollutant loads allowable that would still permit attainment of water quality standards. However, the majority of these analyses have been conducted using assumptions of a stationary climate under which historical data on flow and temperature can be assumed to be an adequate guide to future conditions (Johnson et al. 2011). Research is needed to illuminate the ways in which climate change considerations could be incorporated into a TMDL, and how climate change might influence restoration plans.

The U.S. Environmental Protection Agency (EPA) Region 10 and EPA's Office of Research and Development (ORD) and Office of Water (OW) have launched a pilot research project to consider how projected climate change impacts could be incorporated into a TMDL and influence restoration plans. The pilot research project will use a temperature TMDL being developed for the South Fork Nooksack River (SFNR), in Washington, as the pilot TMDL for climate change analysis. An overarching goal of the pilot research project is to ensure that relevant findings and methodologies related to climate change are incorporated into the SFNR Temperature TMDL in such a way that the regulatory objectives and timelines of the TMDL are also met.

OBJECTIVES

This Performance Work Statement (PWS) is organized and maintains a similar "parallel task structure" that is consistent with the EPA Region 10 Climate Change and TMDL Pilot Project Research Plan (EPA/600/R/13/028, February 12, 2013) and this plan is available on EPA's Internet Site (NSCEP) at www.epa.gov/nscep.

If there is an inconsistency between this PWS and the Project Research Plan, the PWS governs the Contractor's scope and performance. This PWS supports Phase II of the Project Research Plan and is focused on the Research Analysis and Risk/Vulnerability Assessment.

Two Quality Assurance Project Plans (QAPPs) have been prepared for the project, one for the Quantitative Assessment and the other for the Qualitative Assessment. The Quantitative Assessment is a study of temperature sensitivity of the South Fork Nooksack River (SFNR) under future climate using QUAL2Kw. The Qualitative Assessment is the comprehensive assessment of freshwater habitat for ESA salmon recovery in the SFNR under climate change.

Quality Assurance for the Quantitative Assessment is addressed in a separate QAPP completed by Washington's Department Ecology, South Fork Nooksack River Temperature Total Maximum Daily Load (Quality Assurance Project Plan - Publication Number 12-03-126; October, 2012) and is available on Washington's Department Ecology Internet Site at https://fortress.wa.gov/ecy/publications/summarypages/1203126.html

Quality Assurance for the Qualitative Assessment is addressed in a separate QAPP for the EPA Region 10 Climate Change and TMDL Pilot and has been prepared by the Office of Research and Development (ORD); EPA Region 10 Climate Change and TMDL Pilot - Qualitative Assessment, ORD/NHEERL/WED March 14, 2014.

WA 2-10 OPTION PERIOD MILESTONE/DELIVERBALE ACCOMPLISHMENT:

Task 1: Project Contract Administration

Subtask 1A: Prepare Work Plan and Cost Estimate
Deliverable 1: Work Plan and Cost Proposal

Subtask 1B: Establish and Maintain Communication

Deliverable 2: Conference Call
Deliverable 3 (3.1-3.x): Meeting Minutes

Task 2: Project Documentation and Stakeholder Communication

Subtask 2A: Maintain MS SharePoint Project Documentation Library
Deliverable 4: Interim SharePoint Status Memorandum Report
Deliverable 5: Final SharePoint Status Memorandum Report

Subtask 2B: PowerPoint Presentations for Stakeholder Communication
Delayed until Option Period 3

Task 3: Process Roadmap N/A

Task 4: Quantitative Assessment

Subtask 4B: PowerPoint Presentation(s) for Technical Transfer Communication
Deliverable 14: Final Technical Transfer PowerPoint Presentation

Task 5: Qualitative Assessment

Subtask 5B: Conducting the Qualitative Assessment of Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions

Deliverable 16*:* Draft Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe

Deliverable 17: VIDT Webinar Report (#2): Draft Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe.

Deliverable 18: Final Report: Qualitative Assessment – Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe.

Subtask 5C: WRIA 1 Integrated Governance Structure – Stakeholder Engagement for the Qualitative Assessment of Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions

Delayed until Option Period 3

Task 6: Climate Change Considerations for TMDL Development in the SFNR

Deliverable 22*:* Final Report: Climate Change Considerations for Draft TMDL Development in the SFNR – Tetra Tech

Task 7: EPA Final Report

Draft Report Pending (70%) – Final Report Delayed until Option Period 3

Subtask 7B Title: Write the Draft EPA Final Report

Deliverable 23*:* Draft Report: EPA Final Report (70%) – Tetra Tech – Pending

Subtask 7C Title: Peer Review and Reconciliation of the Draft EPA Final Report

Delayed until Option Period 3

Subtask 7D Title: EPA Final Report Review and Clearance

Delayed until Option Period 3

This PWS requests that the Contractor shall perform the following activities:

SPECIFIC TASKS:

Task 1: Project Contract Administration

Subtask 1A: Prepare Work Plan and Cost Estimate

Within 5 days of receipt of the Work Assignment (WA), the Contractor shall schedule a conference call with the WACOR to discuss and clarify the objectives and specific tasks of this work assignment.

The Contractor shall prepare a work plan in response to this work assignment, outlining the proposed approach, expertise and staffing, and resources needed, and a schedule to complete each task. The work plan should identify potential data and tools needed and any potential problems that might be encountered during the execution of the work assignment. It is recommended that the Contractor shall review the EPA Region 10 Climate Change and TMDL Pilot Project Research Plan (EPA/600/R/13/028, February 12, 2013) and this plan is available on EPA's Internet Site (NSCEP) at www.epa.gov/nscep.

Deliverable 1: Work Plan and Cost Proposal
Due: 15 days after receipt

Subtask 1B: Establish and Maintain Communication

Within seven days after work plan approval, the Contractor shall schedule a conference call, not to exceed 1 hour, with the EPA WACOR and appropriate Contractor staff to clarify outstanding questions and confirm the schedule and specific tasks. The Contractor shall provide verbal status updates to the WACOR every other week. The Contractor shall initiate additional communication with the WACOR should developments arise that may affect the conduct or schedule of this Work Assignment (WA).

The frequency of these meetings may be adjusted according to the needs of the project, and the Contractor shall initiate additional communication with the WACOR should developments arise that will affect the conduct or schedule of this WA. The Contractor shall prepare very brief minutes of meetings with EPA staff. The EPA will review the minutes to ensure that an accurate record of the communications has been made and filed.

Deliverable 2: Conference Call
Due: Within 7 days of work plan approval

Deliverable 3 (3.1-3.x): Meeting Minutes
Due: Within 2 days of meetings

Task 2: Project Documentation and Stakeholder Communication

Subtask 2A: Maintain MS SharePoint Project Documentation Library

The Contractor shall update and maintain the existing, Tetra Tech hosted, MS SharePoint Site for the EPA Region 10 Climate Change and TMDL Pilot. Project documentation includes; Project Research Plan, Research Plan Literature and associated EndNote Library, Workshop(s) Agenda, Presentations and Reports, GIS Data and Maps, Tables and Figures from all project reports and all other reports, data, communication and documentation for the Project Research Plan Tasks 1-5.

Deliverable 4: Final SharePoint Status Memorandum Report & Project CD
Due: April 29, 2016

Subtask 2B: PowerPoint Presentations for Stakeholder Communication

The Contractor shall create four PowerPoint Presentations/Fact Sheet Updates on the "EPA Region 10 Climate Change and TMDL Pilot" project to support EPA Project Stakeholder Communication (briefings and/or seminars). These PowerPoint Presentations and Fact Sheet Updates will build upon the existing library of project PowerPoint Presentations with updated information on the project's status and findings/results from the Quantitative/Qualitative Analyses and Draft SFNR Temperature TMDL.

Deliverable 5 Draft PowerPoint Presentation #1 - Fact Sheet Update #2
Due: 1 week after Technical Direction from the WACOR
Deliverable 6: Final PowerPoint Presentation #1 - Fact Sheet Update #2
Due: 1 week after Draft PowerPoint Presentation #1 - Fact Sheet Update #2

Deliverable 7: Draft PowerPoint Presentation #2 - Fact Sheet Update #3
Due: 1 week after Technical Direction from the WACOR
Deliverable 8: Final PowerPoint Presentation #2 - Fact Sheet Update #3
Due: 1 week after Draft PowerPoint Presentation #2 - Fact Sheet Update #3

Deliverable 9: Draft PowerPoint Presentation #3
Due: 1 week after Technical Direction from the WACOR
Deliverable 10: Final PowerPoint Presentation #3
Due: 1 week after Draft PowerPoint Presentation #3

Deliverable 11: Draft PowerPoint Presentation #4
Due: 1 week after Technical Direction from the WACOR
Deliverable 12: Final PowerPoint Presentation #4
Due: 1 week after Draft PowerPoint Presentation #4

Task 3: Process Roadmap

The Contractor shall review, revise, and implement the process roadmap conceptual framework and procedure in the EPA Final Report (EPA Region 10 Climate Change and TMDL Pilot – Process Roadmap: Conceptual Framework and Procedures – Tetra Tech). All Level of Effort (LOE) for the Process Roadmap shall be included in the EPA Final Report (Task 7).

Task 4: Quantitative Assessment

Task Description:

Subtask 4B: PowerPoint Presentation(s) for Technical Transfer Communication

The Contractor shall support the planning, delivery (via Webinar), documentation (written transcript and EPA YouTube recording) and answer follow-up questions (email) from Webinar Participants of one PowerPoint Presentation Seminar on the "EPA Region 10 Climate Change and TMDL Pilot – Quantitative Assessment of Temperature Sensitivity of the South Fork Nooksack River under Future Climates using QUAL2Kw; Final Report – Tetra Tech" to an audience of EPA Regional, Office of Water, State DEQs, Tribal Environmental Organizations and TMDL Practitioners. Note: It is possible that demand for the Webinar may exceed the Webinar or conference line capacity. In that case, a second Webinar will be presented.

Deliverable 13: Webinar of Technical Transfer PowerPoint Presentation
Due: Date TBD by EPA Region 10 and Washington's Department of Ecology, Webinar Co-sponsors.

Task 5: Qualitative Assessment

Task Description:

Subtask 5C: WRIA 1 Integrated Governance Structure – Stakeholder Engagement for the Qualitative Assessment of Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions

The Contractor shall support EPA in planning, conducting and documenting (attend by conference call) a "physical meeting" in Bellingham, WA (October 14, 2015) with the WRIA 1 Management Team. The purpose of this meeting is to provide an informational briefing and submit the Final Report: Qualitative Assessment – Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe as recommendations for consideration by the WRIA 1 Joint Policy Board.

The Contractor shall prepare a PowerPoint Presentation for this meeting based on the Final Report: Qualitative Assessment – Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe. The PowerPoint Presentation from VIDT Webinar (#2), as modified, will be used for this meeting.

Deliverable 14: *PowerPoint Presentation based on*: Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe.
Due: October 7, 2015 - 1 week before the Bellingham, WA Meeting

Deliverable 15: *Meeting* Report – WRIA 1 Management Team: Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe.
Due: October 21, 2015 - 1 week after the Bellingham, WA Meeting

Subtask 5D Title: Peer Review and Reconciliation of the Final Qualitative Assessment Report

The Contractor shall review, revise and reconcile the Final Qualitative Assessment Report based on comments received from the EPA Peer Review. This review is a Formal Peer Review and the Contactor shall reconcile all comments. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the Peer Reviewed Final Qualitative Assessment Report. The Contractor shall prepare a reconciliation memorandum for each of the three Peer Reviewers.

Deliverable 16: Final Qualitative Assessment Report with reconciliation memorandum.
Due: November 15, 2015 - 2 weeks after receipt of Peer Review comments.

Subtask 5E Title: Final Qualitative Assessment Report Review and Clearance

The Contractor shall support EPA/ORD to review, revise and reconcile the Final Qualitative Assessment Report based on comments received from the EPA/ORD Clearance Process. The Contractor shall reconcile all comments. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the EPA Final Report. The Contractor shall prepare a reconciliation memorandum for the comments received during the EPA/ORD Clearance Process.

Deliverable 17: Final Qualitative Assessment Report with reconciliation memorandum.
Due: December 15, 2015 - 2 weeks after receipt of EPA/ORD Clearance Process review comments.

Task 6: Climate Change Considerations for TMDL Development in the SFNR

Task Description:

Subtask 6A: Climate Change Considerations for Final TMDL Development in the SFNR

The Contractor shall support the Final SFNR Temperature TMDL by providing written responses to public comments on the Draft SFNR Temperature TMDL, Climate Change Considerations section.

Deliverable 18*:* Final Report: Summary of Written Responses to Public Comments: Climate Change Considerations for Final TMDL Development in the SFNR – Tetra Tech
Due: 2 weeks after request (through the WACOR) by the SFNR Temperature TMDL EPA Region 10 Staff Lead.

Task 7: EPA Final Report and Scientific Peer Reviewed Journal Article

Task Description:

Subtask 7B Title: Write the Draft EPA Final Report

The Contractor shall write, review and revise the Draft EPA Final Report. The Draft EPA Final Reportwas 70% complete at the end of Option Period 2. The Contractor is expected to utilize the Figures, Tables and Master Reference Endnote Library from the task reports and documented under Subtask 2A: Maintain MS SharePoint Documentation.

Deliverable 19*:* Draft Report: EPA Final Report – Tetra Tech
Due: December 30, 2015.

Subtask 7C Title: Peer Review and Reconciliation of the Draft EPA Final Report

The Contractor shall review, revise and reconcile the Draft EPA Final Report based on comments received from the EPA Peer Review. This review is a Formal Peer Review and the Contactor shall reconcile all comments. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the Peer Reviewed Final Report. The Contractor shall prepare a reconciliation memorandum for each of the three Peer Reviewers.

Deliverable 20: EPA Final Report with reconciliation memorandums.
Due: 2 weeks after receipt of review comments.

Subtask 7D Title: EPA Final Report Review and Clearance

The Contractor shall support EPA/ORD to review, revise and reconcile the EPA Final Report based on comments received from the EPA/ORD Clearance Process. The Contractor shall reconcile all comments. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the EPA Final Report. The Contractor shall prepare a reconciliation memorandum for the comments received during the EPA/ORD Clearance Process.

Deliverable 21: EPA Final Report with reconciliation memorandum.
Due: 2 weeks after receipt of EPA/ORD Clearance Process review comments.

Subtask 7E Title: Co-author with EPA a Scientific Peer Reviewed Journal Article based on the EPA Final Report (Target Journal TBD)

The Contractor shall co-author with EPA, review and revise a Scientific Peer Reviewed Journal Article (approximately 6 pages), based on the EPA Final Report.

Deliverable 22*:* Scientific Peer Reviewed Journal Article – EPA/Tetra Tech
Due: January 29, 2016.

Subtask 7F Title: Peer Review and Reconciliation of the Draft Scientific Journal Article.

The Contractor shall review, revise and reconcile the Scientific Journal Article with EPA, based on comments received from the Journal Peer Review. This review is a Formal Journal Peer Review and the Contactor shall reconcile all comments with EPA. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the Scientific Peer Reviewed Journal Article. The Contractor shall prepare a reconciliation memorandum from the Peer Review.

Deliverable 23: Scientific Journal Article with reconciliation memorandum.
Due: 2 weeks after receipt of review comments.

Subtask 7G Title: Final Scientific Journal Article Review and Clearance

The Contractor shall support EPA/ORD to review, revise and reconcile the Scientific Journal Article based on any comments received from the EPA/ORD Clearance Process. The Contractor shall reconcile all comments. The Contractor and EPA (WACOR) will jointly review all submitted comments and via conference call agree on the scope and responsiveness to the comments as a guide to production of the Final Scientific Journal Article. The Contractor shall prepare a reconciliation memorandum for the comments received during the EPA/ORD Clearance Process.

Deliverable 24: Final Scientific Journal Article with reconciliation memorandum.
Due: 2 weeks after receipt of EPA/ORD Clearance Process review comments

MILESTONES AND DELIVERABLES:

Task	Milestone/Deliverable	Due Date
1	**Project Contract Administration**	
	1A: Work Plan and Cost Estimate	
	Deliverable 1: Work Plan and Cost Proposal	Within 15 days of receipt of WA
	1B: Establish and Maintain Communication	
	Deliverable 2: Conference Call	Within 7 days after WP approval
	Deliverable 3 (3.1-3.x): Meeting Minutes	Within 2 days after Meetings
2	**Project Documentation and Stakeholder Communication**	
	2A: Maintain MS SharePoint Project Doc Library	
	Deliverable 4: Final SharePoint Status Memorandum Report & Project CD	April 29, 2016
	2B: PowerPoint Presentations for Stakeholder Communication	
	Deliverable 5: Draft PP #1 – FS Update #2	1 week after Technical Direction from the WAM (#1)
	Deliverable 6: Final PP #1 – FS Update #2	1 week after Draft PowerPoint Presentation #1
	Deliverable 7: Draft PP #2 – FS Update #3	1 week after Technical Direction from the WAM (#2)
	Deliverable 8: Final PP #2 – FS Update #3	1 week after Draft PowerPoint Presentation #2
	Deliverable 9: Draft PowerPoint Presentation #3	1 week after Technical Direction from the WAM (#1)
	Deliverable 10: Final PowerPoint presentation #3	1 week after Draft PowerPoint Presentation #1
	Deliverable 11: Draft PowerPoint Presentation #4	1 week after Technical Direction from the WAM (#2)
	Deliverable 12: Final PowerPoint presentation #4	1 week after Draft PowerPoint Presentation #2
3	**Process Roadmap**	See Task 7

Task	Milestone/Deliverable	Due Date
4	**Quantitative Assessment** **4B: PowerPoint Presentation(s) for Technical Transfer Communication** **Deliverable 13:** Webinar of Technical Transfer PowerPoint Presentation	TBD by EPA Region 10 and Washington's Department of Ecology, Webinar Co-sponsors
5	**Qualitative Assessment** ***Subtask 5C: WRIA 1 Integrated Governance Structure – Stakeholder Engagement for the Qualitative Assessment of Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions*** **Deliverable 14:** *PowerPoint Presentation based on*: Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe. **Deliverable 15:** *Meeting* Report – WRIA 1 Management Team: Final Report: Qualitative Assessment - Risk/Vulnerability of Climate Change on ESA Salmon Recovery Actions In the South Fork Nooksack River, WA – Nooksack Indian Tribe. ***Subtask 5D Title: Peer Review and Reconciliation of the Final Qualitative Assessment Report*** **Deliverable 16:** Final Qualitative Assessment Report with reconciliation memorandum. ***Subtask 5E Title: Final Qualitative Assessment Report Review and Clearance*** **Deliverable 17:** Final Qualitative Assessment Report with reconciliation memorandum.	October 7, 2015 - 1 week before the Bellingham, WA Meeting October 21, 2015 - 1 week after the Bellingham, WA Meeting November 15, 2015 - 2 weeks after receipt of Peer Review comments. December 15, 2015 - 2 weeks after receipt of EPA/ORD Clearance Process review comments

Task	Milestone/Deliverable	Due Date
6	**Climate Change Considerations for TMDL Development in the SFNR** ***6A: Climate Change Considerations for Final TMDL Development in the SFNR*** **Deliverable 18*:*** Final Report: Summary of Written Responses to Public Comments: Climate Change Considerations for Final TMDL Development in the SFNR – Tetra Tech	2 weeks after request (through the WAM) by the SFNR Temperature TMDL EPA Region 10 Staff Lead.
7	**EPA Final Report and Scientific Peer Reviewed Journal Article** ***7B: Write the Draft EPA Final Report*** **Deliverable 19:** Draft Report: EPA Final Report – Tetra Tech ***7C: Peer Review and Reconciliation of the Final Report*** **Deliverable 20:** EPA Final Report with reconciliation memorandums. ***7D: EPA Final Report Review and Clearance*** **Deliverable 21:** EPA Final Report with reconciliation memorandum. ***Subtask 7E Title: Co-author with EPA a Scientific Peer Reviewed Journal Article based on the EPA Final Report (Target Journal TBD)*** **Deliverable 22*:*** Scientific Peer Reviewed Journal Article – EPA/Tetra Tech ***Subtask 7F Title: Peer Review and Reconciliation of the Draft Scientific Journal Article.*** **Deliverable 23:** Scientific Journal Article with reconciliation memorandum ***Subtask 7G Title: Final Scientific Journal Article Review and Clearance*** **Deliverable 24:** Final Scientific Journal Article with reconciliation memorandum.	December 30, 2015. 2 weeks after receipt of review comments 2 weeks after receipt of EPA/ORD Clearance Process review comments January 29, 2016 2 weeks after receipt of review comments. 2 weeks after receipt of EPA/ORD Clearance Process review comments

ACCEPTANCE CRITERIA:

The Contractor shall complete high quality work as demonstrated in the Base Period of this Contract and under the previous EPA National Water Contract. The Deliverables shall be edited for grammar, spelling, and logic flow. The technical information shall be reasonably complete and presented in a logical, readable manner. Figures submitted shall be of high quality similar to presentations developed for national scientific forums and should be formatted as jpeg or png files. Text deliverables shall be provided in Microsoft Word 2007 or compatible format.

CONFLICT OF INTEREST:

The Contractor warrants that, to the best of the Contractor's knowledge and belief, that there are no relevant facts or circumstances which could give rise to a conflict of interest, as defined in FAR subpart 9.5, or that the Contractor has disclosed all such relevant information.

The Contractor agrees to notify the Contracting Officer immediately, that to the best of its knowledge and belief, no actual or potential conflict of interest exists or to identify to the Contracting Officer any actual or potential conflict of interest the Contractor may have.

The Contractor agrees that if an actual or potential conflict of interest is identified during the performance, the Contractor shall immediately make a full disclosure in writing to the Contracting Officer. This disclosure shall include a description of actions which the Contractor has taken or proposes to take, after consulting with the Contracting Officer, to avoid, mitigate, or neutralize the actual or potential conflict of interest. The Contractor shall continue performance until notified by the Contracting Officer of any contrary action to be taken.

MANAGEMENT CONTROLS:

1. The EPA will review and provide comments on the Work Plan and QAPP.

2. The EPA will also review and provide comments on the subsequent module outlines, module drafts, and conceptual models for each of the candidate causes.

3. The Contractor shall clearly identify itself as an EPA contractor when acting in fulfillment of this contract. No decision-making activities relating to Agency policy, enforcement or future contracting shall take place if the Contractor is present. If the Contractor has a need to meet with Federal employees on-site, then the Contractor personnel shall visibly wear identification in performance of this contract while on-site that will be issued by the Government upon arrival to the Federal facility.

4. Technical Direction: The WACOR is authorized to provide technical direction that clarifies the statement of work as set forth in this work assignment. Before initiating any action under technical direction, the contractor shall ensure that the technical direction falls within the scope of work for this work assignment. The technical direction shall be issued in writing by the WACOR within four working days of verbal issuance. This will be forwarded to the CL-COR and CO for their information and necessary actions.

   The CO is the only person authorized to make changes to this work assignment or contract. The changes must have prior approval from the CO in writing as an amendment or modification to the work assignment and contract.

Technical direction includes direction to the contractor that assists the contractor in accomplishing individual tasks deemed appropriate under the PWS, as well as comments and approval of reports and other deliverables

NOTICE REGARDING GUIDANCE PROVIDED UNDER THIS WORK ASSIGNMENT:

Guidance by the Contractor is strictly limited to management and analytical support. The Contractor shall not engage in activities of an inherently governmental nature such as the following:

1. Formulation of Agency policy
2. Selection of Agency priorities
3. Development of Agency regulations

Should the Contractor receive any instruction from an EPA staff person that the Contractor ascertains to fall into any of these categories or goes beyond the scope of the contractor or work assignment, the Contractor shall immediately contact the CL-COR and the Contract Specialist or Contract Officer.

The Contractor shall also ensure that work under this individual work assignment does not contain any apparent or real personal or organizational conflict of interest. The Contractor shall certify that none exists at the time the work plan is submitted to EPA.

EPA

United States Environmental Protection Agency
Washington, DC 20460

Work Assignment

Work Assignment Number: 3-10

☐ Other ☐ Amendment Number:

Contract Number	Contract Period	Title of Work Assignment/SF Site Name
EP-C-12-060	09/30/2012 To 09/29/2016 Base Option Period Number 3	EPA Region 10 Climate Change a

Contractor: TETRA TECH, INC.

Specify Section and paragraph of Contract SOW: 2a, c, e, g, h i, L

Purpose:
- [X] Work Assignment
- [ ] Work Assignment Amendment
- [X] Work Plan Approval
- [ ] Work Assignment Close-Out
- [ ] Incremental Funding

Period of Performance: From 09/30/2015 To 09/29/2016

Comments:
Full Title: EPA Region 10 Climate Change and TMDL Pilot

☐ Superfund — Accounting and Appropriations Data — [X] Non-Superfund

Note: To report additional accounting and appropriations date use EPA Form 1900-69A.

SFO (Max 2): ☐

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

	Cost/Fee:	LOE:
Contract Period: 09/30/2012 To 09/29/2016	$0.00	0
This Action:	$189,937.00	596
Total:	$68,750.00	596

Work Plan / Cost Estimate Approvals

	Cost/Fee:	LOE:
Contractor WP Dated: 10/15/2015	$189,937.00	596
Cumulative Approved:	$68,750.00	596

Work Assignment Manager Name: Steve Klein (Signature) (Date)		Branch/Mail Code: Phone Number: 541-754-4858 FAX Number:
Project Officer Name: Ruth Corn (Signature) (Date)		Branch/Mail Code: Phone Number: 513-569-7920 FAX Number:
Other Agency Official Name (Signature) (Date)		Branch/Mail Code: Phone Number: FAX Number:
Contracting Official Name: Mark Cranley (Signature)	11/13/15 (Date)	Branch/Mail Code: CPOD Phone Number: 513-487-2351 FAX Number: 513-487-2109